Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Charged Multi-Hadron Systems in Lattice QCD+QED MICHAEL WAGMAN, Fermilab — QED effects must be included in lattice QCD calculations in order to make Standard Model predictions with percent-level accuracy, to constrain isospin-breaking effects in hadronic and nuclear EFTs, and to study the interplay of nonperturbative QED and QCD effects in nuclei. Lattice QCD+QED calculations of single-hadron masses and matrix elements have recently been performed by several groups and the corresponding formalism for matching to hadronic EFTs including QED finite-volume effects has been developed. In this talk, I will discuss lattice QCD+QED calculations of charged multi-hadron systems, which face additional challenges from the presence of Coulomb interactions that are nonperturbative in large volumes. I will present lattice QCD+QED results by the NPLQCD and QCDSF collaborations for the ground-state energies of systems of 1-12 charged and neutral mesons as well as 1-3 charged and neutral nucleons in multiple finite volumes. These lattice QCD+QED results are then used to constrain two-body and three-body couplings for charged and neutral mesons in a non-relativistic hadronic EFT. The practical range of volumes for which Coulomb effects can be treated perturbatively in EFT is discussed.

Michael Wagman
Fermilab

Date submitted: 01 Jul 2020 Electronic form version 1.4